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IN THREE SECTIONS

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EDITORIAL DEPARTMENT NOTE

Of the three elements of cost—material, labor and overhead—the most difficult of application to jobs and contract is overhead. The problem is further complicated when both normal products and war products manufactured under government contract are produced in the same plant. This is the area covered by the first article in this issue of the *Bulletin;* the principles outlined there will be of interest to all cost accountants.

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The second article in this issue of the *Bulletin* describes the advantages to be obtained through the use of microfilm in the preservation of accounting records. With the need for reduction in filing space, the need of saving office help by eliminating all office records that are not essential and the need for preserving against destruction the more important records, the use of photography in accounting should not be overlooked.

The author of this article is David S. Potts, Cost Accountant for the Bethlehem Steel Co. at Lebanon, Pa. Mr. Potts received his training in accounting at Temple University, and is a graduate of the Temple Secretarial School. He has been connected with the Bethlehem Steel Co. and its subsidiaries since 1937.

Articles published in the *Bulletin* present many different viewpoints. In publishing them the Association is not sponsoring the view expressed, but is endeavoring to provide for its members material which will be helpful and stimulating. Constructive comments are welcomed and will be published in the Forum Section of the *Bulletin.*

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DECEMBER 15, 1942

THE DISTRIBUTION OF OVERHEAD COSTS IN COMPANIES HANDLING BOTH NORMAL AND WAR CONTRACTS

By Samuel Waldo Specthrie, Assistant Professor of Accounting Northwestern University, Chicago, Ill.

TO THE members of N.A.C.A., I take it that the term "cost" includes not only the cost to make, but also the cost of selling and of administering the business. It is from this viewpoint of a total cost that I shall consider the topic.

The entire cost to make, sell, and administer is divided into (1) material, (2) labor, and (3) expense. Material is the cost of the substances used in making the product, labor the cost of the human effort, and expense all the other costs to make, sell, and administer. Each of these cost elements is itself divided into (1) direct and (2) indirect. By direct costs we mean those material, labor, and expense items conveniently allocable to specific projects. By indirect costs we mean those material, labor, and expense items not conveniently allocable to specific projects. The sum of the indirect material, labor, and expense items we term overhead and generally we consider and distribute separately the manufacturing and non-manufacturing overhead.

Overhead Proration

In the determination of accurate unit costs, the direct items offer little difficulty. If a job lot plan of costing is used, accuracy in the direct costs is largely a matter of rigid adherance to a strict plan of material requisitions, labor time tickets, and direct expense vouchers. The difficult problem of cost accounting lies in accurately prorating among the benefiting contracts, the indirect or overhead costs of manufacture, sales, and administration. In fact, the seriousness of a company's costing problems is likely to be determined by the ratio of total overhead to the total cost to make, sell, and administer. The higher the ratio, the more serious the problem of costing.

In the cost accounting for overhead the usual procedure is first to accumulate its amount according to a predetermined classification, and then to prorate it among the benefiting jobs on some

arbitrary, though, it is hoped, equitable basis. In the development of my topic I shall try to cover both the accumulation and proration phases of accounting for overhead costs.

The problems in distinguishing between the overhead costs assignable to (a) war contracts and (b) normal production, in a plant doing both kinds of work, will vary with (1) the basis for pricing the government sales and (2) the extent to which the government items differ from those made normally. Space does not permit consideration of all the possible cases, but I will discuss the four most common situations, viz.:

1. The company makes the same products on war contracts as it does normally and sells to the government at flat prices.
2. The company makes the same products on war contracts as it does normally but sells to the government on some cost-based plan.
3. The company makes entirely different products on war contracts than it does normally but sells to the government at flat prices.
4. The company makes entirely different products on war contracts than it does normally and sells to the government on some cost-based plan.

Normal Products Sold at Flat Prices

The case where the company makes the same products as normally and sells to the government at flat prices is the simplest of the four and the easiest to solve satisfactorily. Since the government is not a party of interest to the cost accounting, the solution can be adapted to the special circumstances of the company involved. The cost accountant merely eliminates from the overhead rates applied to the government contracts those indirect expenses he deems inapplicable to them. Thus from the factory overhead rate he may eliminate such items as the cost of plant guards, personnel training, and overtime labor, because for the government contracts they are sufficiently large and distinguishable to be charged as direct burden. Again from the selling overhead rate he may eliminate those kinds of advertising and sales representation costs that he sees are not undertaken for the benefit of government contracts.

In the simple circumstances of the normal product sold to the government at a flat price all the overhead can be applied to production. That justifiable overhead expenditure which, in the opinion of the cost accountant, is not applicable to government production, is applicable to the normal work. Since the cost accounting in this instance is solely for the information of the contractor it is the kind of cost accounting least likely to be affected by either honest or ulterior bias.

Normal Products Sold on a Cost-Based Plan

The flat price plan under ordinary conditions is undoubtedly best for all concerned. Competitive bidding keeps the price to the government at a fair minimum, there is no need for the government to regulate and audit the contractor's accounting, and the contractor can cost account in the way he deems best suited to his circumstances. But these are not ordinary times, and the volume of government work to be let so strains the nation's industrial capacity that even for normal products competitive bidding cannot afford full protection to the government. The inevitable result has been the development of the cost-based contract.

Any plan of profit limitation on a specific contract has the effect of making the selling price of that contract cost based. This is true whether the profit limitation be in the form of a fixed fee, a per cent of cost or selling price, or a fair rate of return on the investment. When a contract is cost based the government becomes a party of interest to the cost accounting and it must issue regulations as to the items allowed as contract costs. The effect of such regulations is to introduce into cost accounting the concept of a statutory as distinguished from an accounting cost.

Allowable and Unallowable Costs

A good short summary of the items allowable and unallowable as overhead cost under government cost-based contracts is given in a booklet entitled "Principles for Determination of Costs Under Goverment Contracts," issued jointly by the War and Navy Departments. A study of the booklet shows that about all the items of factory overhead are allowed as well as many non-manufacturing overhead items. For factory overhead, among the items listed as allowed are:

1. Supplies
2. Indirect labor
3. Repairs and maintenance
4. Research and development
5. Utilities
6. Taxes
7. Insurance
8. Depreciation
9. Employee welfare
10. Service travel
11. Supervision
12. Rent

For non-manufacturing overhead, among the items listed as allowed are:

1. Bidding and bid preparation
2. Delivery and installation costs
3. Ordinary legal and accounting
4. State sales and use taxes
5. Office expenses
6. Advisory sales services

The broad principle used in distinguishing the allowable overhead items is stated to be that of whether the cost is reasonably necessary for the performance of the contract. However, this principle is not too closely followed. Thus, advertising expenditures of a solely institutional character are specifically allowed while the executive salary of a man absolutely necessary to the performance of the government contract is to the extent that it exceeds a stated amount arbitrarily disallowed.

Types of Unallowable Costs

Manufacturing and non-manufacturing overhead items expressly disallowed as cost chargeable to government contracts mainly compose:

1. Items *not expenditure costs* nor amortizations of expenditure costs, as for example depreciation on appraisal increments and accruals of deferred maintenance.
2. Items *not costs at all,* like interest on loans or income taxes.
3. Items of cost *in contravence of public interests,* like bribes, lobbying activities and unwarranted salaries.
4. Items representing *duplicates of costs already charged* directly to the contract, as say armed guard service or spoilage.
5. Items clearly *unrelated to performance* of the government contract, as illustrated by:
   (a) Expense of idle facilities
   (b) Corporate entity costs
   (c) Bad debts
   (d) Capital losses
   (e) Entertainment items
   (f) Commercial advertising

In the main the government's division of the overhead cost items as between those (1) allowable and (2) unallowable for cost-based contracts is not an unreasonable one. Criticism is possible of the complete disallowance of non-expenditure costs or the limitation on the allowable amount of an executive salary, but reflection shows that another course would either unduly complicate the administration of the cost accounting or contravene the public interest. Thus to allow depreciation on appraisal values would not only require revaluation on a present-day basis of each involved war plant but perhaps its periodic re-appraisal as the price level changed. Again the allowance as a cost of too large executive salaries might lead to abuses detrimental to the public morale.

How Prorate?

For good or for bad, if it is cost based, some overhead costs are and some are not chargeable to the war contract. The question arising is, how should proration of the total overhead costs then be made? The problem has two aspects:

1. That of accumulating the overhead costs, and
2. That of prorating the overhead costs.

In accumulating the overhead costs it is desirable that separate account classifications be used for (1) the allowable and (2) the unallowable overhead items. Doing this assures the propriety of the overhead base to be apportioned in part to the cost-based war contracts.

In prorating the total overhead costs the fundamental problems are:

1. The basis for apportioning the allowable expenses between the normal and war contracts, and
2. The disposition of the unallowable expenses.

If only normal items are produced for both the industrial and war contracts, no serious problem of fair apportionment exists. Since the basic conditions of manufacture have not changed and are the same for all the production, the already established method of charging overhead to the jobs should usually be satisfactory.

Memorandum Distribution of Unallowable Costs

The unallowable overhead cannot be charged to the recoverable costs of the cost-based contracts. Yet in many cases the negligible amount of industrial production cannot possibly bear all the unallowable overhead. Inevitably, then, under cost-based war contracts there is going to be an unabsorbed amount of unallowable overhead costs. This unabsorbed cost can be charged to profit and loss. In addition, it is a good plan to make a memorandum distribution of it on some reasonable basis among the war contracts. In this way the record for each war contract would show:

1. The selling price
2. The allowed costs,
3. The apparent profit,
4. The unallowed costs, and
5. The real profit.

In many cases the real profit will be disclosed to be far from too large.

Markedly Different Products Made on War Contracts

In the two cases already considered an easing factor in the distribution of the overhead costs between the normal and the war contracts is that both involved the same normal product. This fact means that usually no change is necessary in:

1. The long established departmentalization for overhead proration, and
2. The methods of prorating overhead to the specific jobs.

Furthermore, overhead cost estimating and interim overhead cost determination can with fair reliability be based on the normal burden rates developed over the years of previous experience in that line of manufacture. True, adjustment will be necessary for the probable increase in the hours of plant operation and in the various overhead expenses, but the problem is only the limited one of expanding a satisfactory existing overhead proration plan.

Far different and more difficult is the case where the war products differ markedly from those normally made. Here the problem is often not one of adjusting an existing reliable method of

overhead accumulation and proration, but of devising an entirely new plan. This may involve the establishment of

1. Altogether new overhead distribution centers,
2. Different methods of overhead proration, and
3. Normal overhead rates having no experience basis.

Each of these tasks must often be done quickly and under rapidly changing conditions. It should therefore be no surprise if the results are often much short of even good.

Basis for Accumulation and Proration

If markedly changed manufacturing conditions force the establishment of new burden accumulation and distribution centers, the sound plan is to group in a burden distribution center only such machines as involve similar overhead costs. If this is done, an hour method of burden proration will result equitably because the necessary condition of each hour of available operating time involving about the same overhead cost as any other hour will then exist. Of course, the difficulty will lie in predetermining without a basis of past experience what the overhead costs per hour will be for a given kind of machine.

Important too is an inquiry into the equity of the method of burden distribution. Thus if marked changes in the manufacturing conditions now cause machine-associated expenses to dominate the conversion costs, it may be desirable to use machine hour instead of direct labor hour factory overhead rates. Again, if overtime or bonus plans now cause the effective hourly wage rate to vary markedly with the worker, it may be necessary to use a direct labor hour rate instead of a direct labor cost per cent for charging factory overhead to the jobs. Here again, obstacles to sure decision are the limited time for doing the work, the continually changing manufacturing conditions, and the lack of an experience basis.

Establishing Normal Burden Rates

To estimate a "normal" burden rate it is necessary to know (1) the "normal" expenses and (2) the normal direct labor or machine hours. Ordinarily, based on past experience neither figure is difficult to estimate. Under the conditions of a completely altered manufacturing program, different machinery, new help,

and continual expansion, each figure may be difficult to even approximate.

The regulations specify that only actual costs are chargeable to government contracts. It may be asked why it is necessary to estimate a normal burden rate. The answer is that only as accurate normal rates are available is computation possible of the reliable interim unit costs necessary as a guide to:

1. Bids for additional government business, and
2. Decisions on operating policy.

Marked difference in their conditions of manufacture accentuates the problem of proration between the normal and war products of their common overhead costs. The wise procedure is to minimize this problem of common overhead costs by strictly separating the plant area and personnel used for normal from that used for war work, but in some form the problem invariably exists. To solve it to the satisfaction of both the government and contractor is often difficult. Thus, although only 20 per cent of the dollar volume of the output, the peculiar nature of the war production may cause it to use 60 per cent of the supervisory and technical services. Again the war work may be responsible for all the increase in cost over normal of a joint facility. Thus, to permit the installation for war work of fifty-ton traveling cranes, the walls of a building are strengthened. For normal production the thickened walls have no value. Therefore the depreciation of this portion of the building cost must be made solely as a charge to the war contracts.

When the war products are sold at a flat price, the cost accounting problems are solely the concern of the contractor. Their solution can not only be adapted to his special circumstances as seen by the cost accountant but also to allow absorption by the total production of all the overhead costs. When the war contracts are cost based, the government is a party of interest to the accounting, its regulations broadly govern the cost accounting, and all the incurred overhead can be distributed only if:

1. Normal production is unfairly charged with all the unallowable overhead costs, or
2. War production is memorandum charged with its reasonable share of the unallowable overhead costs.

PHOTOGRAPHY IN ACCOUNTING

By David S. Potts, Cost Accountant,
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FOR many years accountants, particularly those having to do with office management, have been concerned with the storage of business records and the cost thereof. The problem has been more troublesome in some industries and types of concerns than in others. Insurance companies have probably been the most subject to the problem because of the necessity for maintaining practically indefinitely the available papers pertaining to millions of insurance policies. Manufacturing companies have not suffered to the same extent, but the difficulty of the manufacturer has been immeasurably increased in the last decade through complications developed by government regulations, such as the Fair Labor Standards Act, the Social Security Act, state compensation regulations and many others.

Transfer files for housing old records that must be maintained, even though they are inactive, have been developed and revised, but still consume space. Every office manager has done his utmost to reduce the cost of storing the records. Some companies, such as the Metropolitan Life Insurance Company, have built warehouses in low rent districts in order to eliminate a large portion of file storage expense.

Increased Possibility of Loss of Records

Current, as well as inactive records, present a new and important problem when considered as subject to destruction by enemy bombing or sabotage in its many forms. Currently, elaborate organization and constructive systems have been developed to get fires under control, clear away debris, repair buildings and get the afflicted plant back into production.

But what about internal damage? What about stocks and bonds? What about notes destroyed? What about inventories, checks, reports, payrolls, bills, invoices, receipts, ledgers, all of which conceivably may have been damaged beyond use? Do the brokers, bankers, manufacturers, and merchants have to declare

a moratorium, or perhaps start from scratch? Emphatically not! Faced by wartime hazards, many large companies are taking the precaution of having their important papers and records preserved on rolls of non-inflammable sixteen millimeter film, with duplicate rolls stored outside the vital areas where there is little danger of destruction. In the case of the hypothetical bombing, those concerns microfilming their records, were able to salvage them with a minimum of delay. Employees were paid on time; statements went out; notes were met. With hardly a hitch, business resumed its normal tenor.

Advantages of Film Records

In the use of this microfilm process, business has followed the lead of the libraries and museums, which have developed the science of photographing rare manuscripts and records. Film, properly processed will not fade, as do some inks; nor will it crumble as will paper. Spools of film, which have been stored away under the most unfavorable conditions in the basement vaults of a bank for over ten years, were found to be in perfect condition when brought once again to light.

It may also be recalled, that sundry records and papers were microfilmed for posterity, and placed in the Time Capsule at the New York World's Fair in 1939. Scholarships have been granted by research foundations for the study of this method of preservation of valuable paper. In addition to the wartime necessity of the preservation of records from destruction, several other reasons for adopting the microfilm process have been set forth by its users.

Savings in Material and Space

This method saves paper by eliminating the necessity of providing file copies. Longhand and drawings may be photographed as well as printing, and thus a great deal of typing, photostating, and blueprinting may be saved.

It becomes self-evident, that along with this economy of materials, a considerable saving of space is effected. The image on the sixteen millimeter film is only one twenty-third as large as the general run of business paper. On one hundred feet of film, it is possible to photograph more than three thousand sheets of eight-and-a-half by eleven paper, or as many as eight thousand

checks. This hundred feet of film is spooled into a box, three and three-quarters, by three and three-quarters, by seven-eighths of an inch thick. This makes it possible to save more than ninety per cent of the space regularly used for filing, as one of the filing cabinets used for storing the film can hold as much as a hundred regular letter-size filing cabinets.

The fact that these economies extend over into peacetime business practice, carries added weight with concerns employing the microfilm process.

The Recording Process

The process itself is briefly explained. While several companies produce the microfilming machines for the preservation of business records, the principle of operation in all of them is the same.

In a cabinet about five feet long, and varying in width according to the size paper it accommodates, are an electric motor and a camera. This camera is similar to one used to take home movies, except that it contains two prefocused lenses, and accommodates two one-hundred-foot rolls of film. Thus in reality, it is two cameras in one. At the point of focus, are a bank of lights, and two sets of rollers. These rollers are set so delicately that if two sheets of paper are inserted at the same time by mistake, the machine will not operate.

When a sheet of paper is inserted, it starts the electric motor, which moves the film to an unexposed portion, stops the paper, turns on the lights for an exposure, turns them off, and drops the paper, in the order of its insertion, into a hopper at the bottom of the machine. This process is repeated with each sheet of paper until the spool of film is all exposed. Then a buzzer sounds, and the camera is reloaded.

The operator is able to make two copies of a paper simultaneously, as the camera exposes two rolls of film at once. This saves running the paper through again, or having a duplicate made at the processing plant, involving increased expense. The owner is safeguarded too, in being able to hold one roll of film until the other comes back from the processing plant, thus assuring himself a copy in case the first is lost or destroyed in transit. In having two copies, the owner has both a working copy for his files, and a copy to store in a place safe from destruction or loss. Most

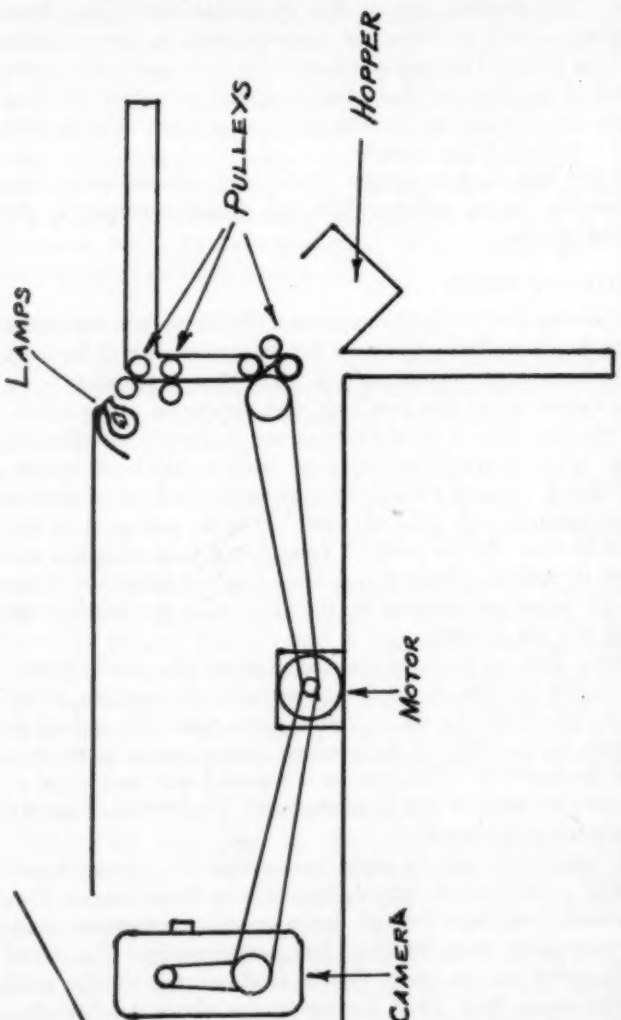

EXHIBIT 1 - RECORDER

companies discard the paper photographed as soon as the developed film is returned to them.

Many of the large department stores save considerable amounts of money yearly, due to the fact that they make only one copy of the customers' statements each month, and record it on film for their own purposes. With shortages of paper due to war needs, recording on film instead of keeping duplicate paper copies is not only economical and practical, but patriotic as well.

The companies which manufacture the machines maintain developing plants to process the films, which are done overnight, and mailed back the day after receipt. The film is returned to the owner in spools of one hundred feet each. These are enclosed in cardboard boxes that have space for filing data on the end and sides, as well as ample room for an index of the contents of the spools.

The Viewer

Now that the records are reduced to minute size, free from the hazards of destruction, the question arises as to how they are returned to a readable and usable size. This is accomplished by the use of a reader, which is a box about two feet high, and about a foot-and-a-half wide and long. On top of the box is a lamp-house and racks for the film spools. The light is passed through the film and so through a lense onto a sheet of ground glass set at an angle to enable the operator to see it from the front. The image appears much the same as in the small projection machines one often sees in shop windows, although in this case the image appears in its natural size. The projection machinery is set on the top of a turntable in order that the image may be shown right side up, no matter at which angle the picture was taken. A crank is provided on the film racks in order that the film may be turned rapidly to the portion desired. There are several models of these viewers, varying in size, and equipped with various accessories.

There are tilted models on two legs, which may be used at a desk, other larger models with desk high legs of their own, and still other models in which recorder heads, and projector heads are interchangeable, making two machines out of one. This latter type can be attached to the top of the special filing cabinets in which the spools of film are stored. Most models have, however,

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EXHIBIT 1 - RECORDER

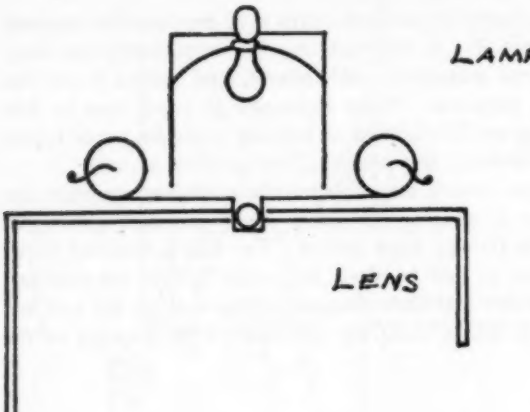

EXHIBIT 2 - VIEWER

facilities for making enlarged prints from the film roll, by removing the ground glass, and projecting the image on sensitized paper in a darkened room. After proper exposure, the sensitized paper is developed and fixed like a regular photograph.

It might be noted here, that photographic proof is admissible in a court of law, and the Federal Government uses this system itself.

In actual practice, an operator can photograph from nine to fifteen hundred papers an hour. An expert can step up his speed to an even higher output. The part-time employee, without previous knowledge of the machine's operation, is able to turn out five or six hundred copies an hour.

Protection Against Fraud

A final, and extremely important consideration in the use of microfilm records is the protection from fraud which this process insures. Let us take another hypothetical case or two by way of illustration:

A depositor fails to enter upon his check stub a personal check he has cashed at his bank. When his canceled checks are returned to him, he burns the unrecorded one. His next step is to notify the bank that he cannot reconcile his balance with his canceled checks. The bank can only assume then, that there has been either dishonesty or error on the part of its own staff, as the original check cannot be produced—unless, of course, there is photographic evidence of the original check in the bank's possession.

Or suppose an employer has an employee cash a check for him at a bank. Between the office and the bank, the employee raises the check, and destroys it when it is returned canceled. The bank has no proof that the check was no different from the sum stated on the employer's stub. In fact the bank has no proof at all that the checked was cashed unless it was photographed.

If a teller was passing checks twice, the fact would soon be discovered, if the checks were photographed daily. Or should a teller forge a check in an inactive account, the bank could easily ascertain whether it was an inside job, or whether the depositor was dishonest.

By way of summary then, we find that the use of the microfilm process is a valuable aid to the business man and the accountant in maintaining his records both during the war and in

peacetime. Its relative safety from destruction, its permanence, its space saving virtue, its economy of materials, and its protection against fraud make it a valuable development in the methods of good accounting.